2.0 DESCRIPTION OF THE PROPOSED ACTION

DOE proposes to transport contact-handled LLMW from the Hanford Site to the Allied Technology Group (ATG) Mixed Waste Facility (MWF) in Richland, Washington, for non-thermal treatment and to return the treated waste to the Hanford Site for eventual land disposal. Over a 3-year period the waste would be staged to the ATG MWF, and treated waste would be returned to the Hanford Site. The ATG MWF would be located on an 18 hectare (ha) (45 acre [ac]) ATG Site adjacent to ATG's licensed low-level waste processing facility at 2025 Battelle Boulevard. The ATG MWF is located approximately 0.8 kilometers (km) (0.5 miles [mi]) south of Horn Rapids Road and 1.6 km (1 mi) west of Stevens Drive. The property is located within the Horn Rapids triangle in northern Richland (Figure 2.1). The ATG MWF is to be located on the existing ATG Site, near the DOE Hanford Site, in an industrial area in the City of Richland.

The effects of siting, construction, and overall operation of the MWF have been evaluated in a separate State Environmental Policy Act (SEPA) EIS (City of Richland 1998).

The proposed action includes transporting the LLMW from the Hanford Site to the ATG Facility, non-thermal treatment of the LLMW at the ATG MWF, and transporting the waste from ATG back to the Hanford Site. Impacts from waste treatment operations would be bounded by the ATG SEPA EIS, which included an evaluation of the impacts associated with operating the non-thermal portion of the MWF at maximum design capacity (8,500 metric tons per year) (City of Richland 1998).

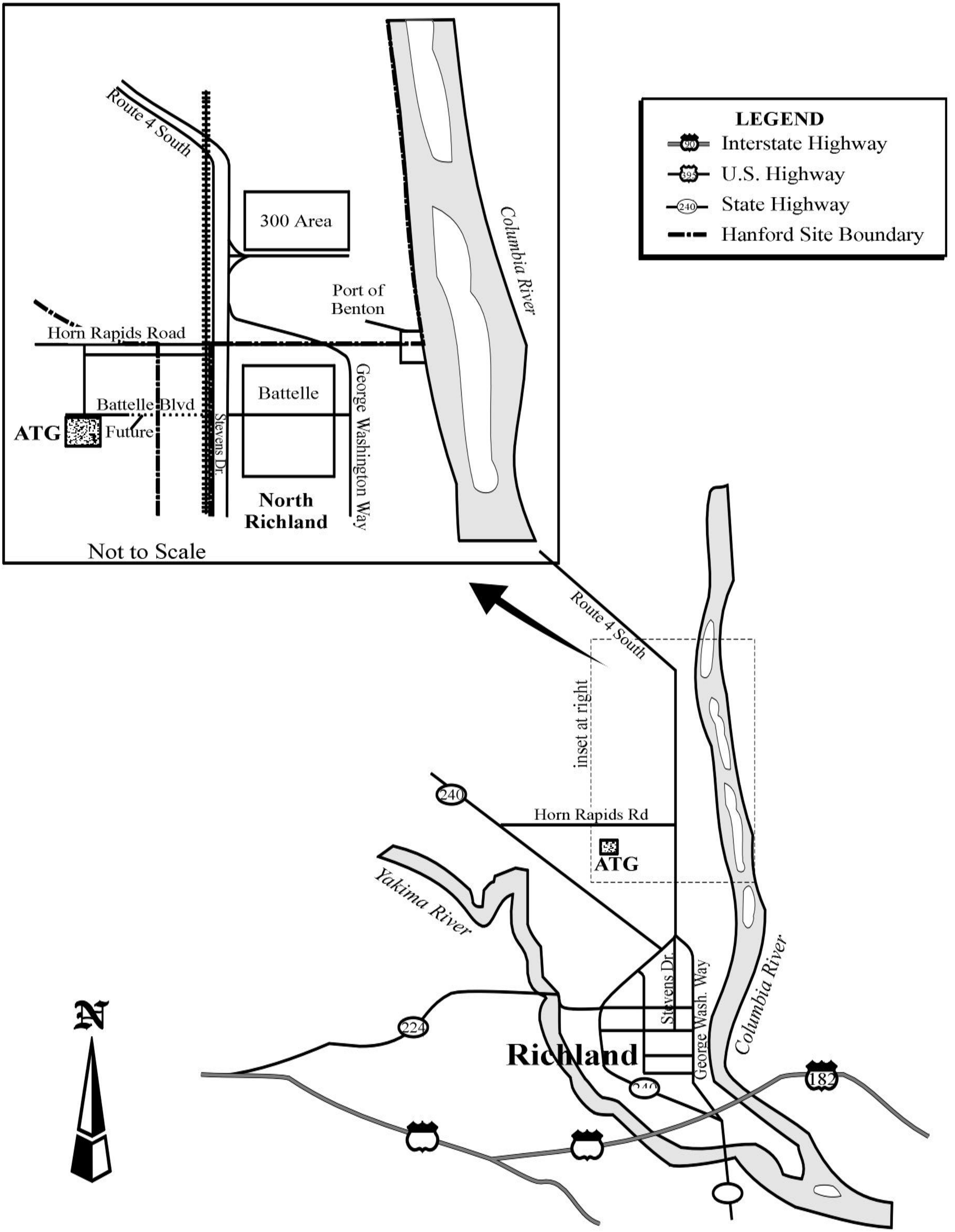
Up to 50 employees would be required for non-thermal treatment portion of the MWF. This includes 40 employees that would perform waste treatment operations and 10 support staff. Similar numbers were projected for the thermal treatment portion of the MWF (City of Richland 1998).

2.1 WASTE TRANSPORT

Untreated waste is or will be stored at the Hanford Site's 200 West Area, approximately 33 km (20 mi) northwest of the ATG MWF. ATG would transport the waste to and from the ATG Facility by truck. Approximately 95 percent of the 33 km (20 mi) transport route would be on the Hanford Site. ATG's waste transport operations are required to meet the requirements of the U.S. Department of Transportation (DOT) and the WSHWMA. Once treated, the waste would be returned to the 200 West Area for eventual land disposal.

All waste transport truck drivers would be required to be trained in proper waste handling, regulatory compliance, and spill emergency response procedures. ATG health and safety technicians would dispatch trucks, check safety equipment (lights, brakes, signals, tires), and ensure that vehicles are in compliance with applicable DOT regulations. Health and safety technicians would also accompany trucks on all trips.

Figure 2.1 ATG General Location Map



2.2 WASTE HANDLING

Waste handling covers packaging or repackaging, loading, receiving and inspecting, assaying, sorting, and tracking the waste containers.

Preacceptance Inspection

Only waste that would be amenable for management, storage, and treatment at the ATG Facility would be accepted. The acceptance determination would be based on information provided by DOE during the preacceptance process. The preacceptance process would use DOE-supplied information to evaluate waste characteristics, additional laboratory analysis requirements, waste confirmation procedures, and waste treatment formulation.

Repackaging and Loading

The waste containers would be loaded from temporary storage at the 200 West Area onto ATG trucks. All waste handling and loading activities at the Central Waste Complex would be conducted by Hanford Site contractors. Activities would include handling, loading, and if necessary waste packaging. ATG would transport the waste to and from the Hanford Site. ATG would be required to follow DOE environmental, health, and safety requirements during the waste handling and loading operations at the Hanford Site. Waste containers would also be profiled and manifested according to all DOT, RCRA, and WSHWMA regulations governing transport of wastes.

Inspecting and Assaying

ATG waste acceptance would follow procedures specified in an approved radioactive materials license and RCRA final facility permit for the characterization of the waste's radioactive, chemical, and physical properties. Waste manifests would ensure that the waste does not exceed the limits permitted by ATG's permits and licenses. If during waste confirmation and verification inspections at ATG, the waste characterizations show higher levels of radioactive or hazardous constituents than permitted by the facility's permits and licenses, the waste would not be accepted but rather returned to the Hanford Site. Facility inspectors also would confirm that the waste is suitable for treatment by stabilization. Each waste container would be labeled and bar-coded, and the waste container properties would be logged into a computerized database. After treatment, waste containers would be reexamined and certified for transport and disposal.

Waste Constituents and Physical Characteristics

The LLMW would contain hazardous constituents regulated by the WAC (WAC 173-303). The hazardous nature of the waste includes many different waste constituents including characteristic waste constituents, listed waste constituents, and Washington State dangerous waste constituents. Specific waste containers that would be potentially treated under this action are identified in the Hanford Mixed Waste "Debris" Statement of Work as a part of the contract between DOE and ATG. DOE and Hanford Site contractors believe the relevant treatment technology for the identified waste containers is non-thermal stabilization. Individual package characteristics are provided in terms of container volume, waste type, waste weight, package dose rate, and dangerous waste codes (Jacobs 1998). Detailed characterization data for the waste that

would be treated under this action were not available. However, data are available on a more global basis for Hanford Site LLMW, which were assumed to provide a conservative basis for evaluating potential environmental impacts from the non-thermal treatment of LLMW.
The chemical and radiological characteristics of the waste stream evaluated in this EA were assumed to be similar to those evaluated in the thermal treatment EA, with the exception of polychlorinated biphenyls (PCBs) (DOE 1996a). This is assumed to be a conservative assumption for the chemical-related impacts evaluated in this EA because in general those waste packages with higher concentrations of hazardous chemicals would be targeted for thermal treatment. The chemical and radiological inventories developed in support of the accident analysis are presented in Table 2.1 and 2.2.

The waste's physical characteristics are generally comprised of organic, inorganic, and/or metallic debris type material meeting RCRA's debris definition in 40 CFR 268. Some of the waste packages contain some non-debris material (i.e., soil, particulate, sludge, etc.); however, all packages will contain greater than 50 volume percent debris material based on visual and/or real-time radiography inspection. The waste stream identified for treatment at ATG includes approximately 100 m^3 (130 yd^3) of non-debris waste with the balance of the waste stream volume defined as debris waste.

A number of radiological constituents would be expected in the waste, including alpha emitting radionuclides. TRU radionuclides in the waste matrix will not exceed 100 nanocuries/gram; therefore this waste would not be designated as TRU waste by DOE. The surface dose rates for most of the waste containers is less than 1 mrem/hr (Jacobs 1998).

Table 2.1. Representative Chemical Inventory

Chemical (chemical class)	Inventory in 2,600 m^3 of waste, kg
Benzene (solvents, thinners, glycols, glycol ethers)	8.8E+02
N-butyl alcohol (solvents, thinners, glycols, glycol ethers)	4.6E+02
2-hexanone (solvents, thinners, glycols, glycol ethers)	1.9E+02
Methylene chloride (solvents, thinners, glycols, glycol ethers)	4.0E+02
Tridecane (petroleum, coal tar derivatives)	2.8E+03
Sodium Silicate (metals, metal salts, pigments)	5.7E+01
Ammonia (amines)	1.2E+02
Sodium hydroxide (caustics)	2.0E+02
Other (no acute health impacts)	2.2E+03

Notes:

This inventory represents the chemical inventory developed for accident analysis. This inventory was developed by sorting chemicals into chemical classes by type and selecting a representative chemical from each class that would provide conservative health impacts. Air emissions estimates used to evaluate impacts from normal operations included additional chemicals that fall into the chemical classes identified in the table.

Table 2.2. Radiological Inventory

Isotope	Inventory in 2,600 m^3, Ci
Cs-137	7.8E+01
Sr-90	7.1E+01
H-3	1.2E+01
Fe-55	8.1E+00
Mn-54	4.0E+00
Ce-144	1.2E+00
Co-60	7.9E-01
Eu-154	5.8E-01
Pm-147	5.3E-01
Pu-241	4.0E+02
Pu-238	6.3E+00
Am-241	5.6E+00
Pu-239	2.0E+00
Pu-240	4.7E-01
Np-237	2.3E-02
C-14	2.4E-01
I-129	6.7E-01
Tc-99	4.4E-02

Notes:

This inventory is based on Hanford Site LLMW and is the basis for the accident calculations. Air emissions estimates taken from the RCRA Part B risk assessment work plan that were used in evaluating impacts from routine air emissions includes additional radionuclides that were not reported in Hanford Site LLMW inventory (Tetra Tech 1996b).

Total inventory activity taken from Table 1 (Tetra Tech 1996b).

Tracking

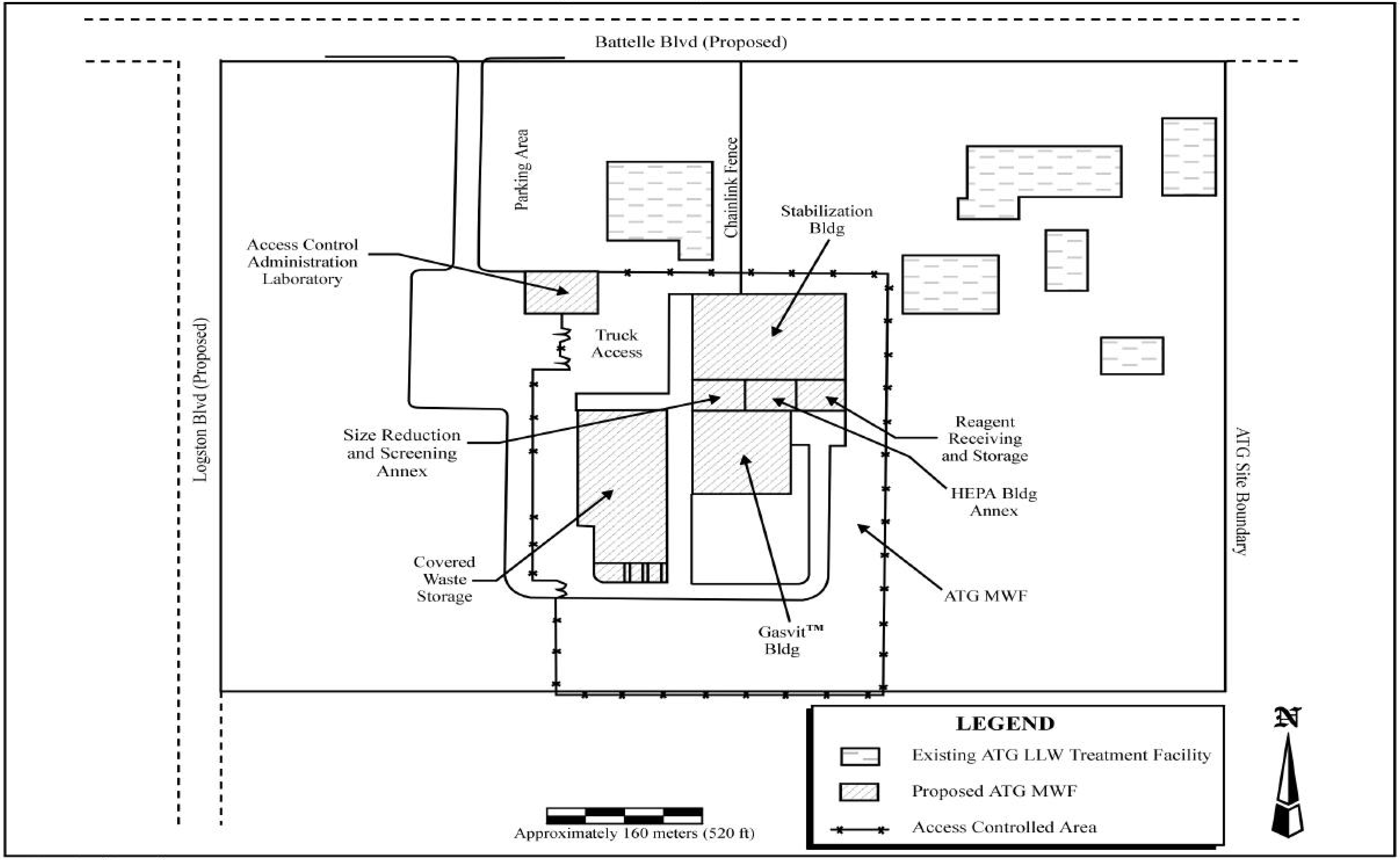
Waste units would be tracked throughout the ATG shipping and treatment activities with the help of automated data systems. Workers handling, receiving, inspecting, and assaying the waste would log in the times, dates, and locations of each transaction and waste type, volume, and weight.

2.3 FACILITY AND PROCESS DESCRIPTION

Facility Description

The non-thermal treatment portion of the MWF would consist of three buildings; the Stabilization (non-thermal treatment) Building, the Waste Storage Building, and the Administrative Building, as shown in Figure 2.2. The MWF would be a RCRA-permitted facility designed with the necessary equipment and safety features to safely store, handle, and treat LLMW. The stabilization treatment operation would be located in an existing ATG building. The remaining portions of the main treatment facility would include an addition to the

Figure 2.2. Layout of ATG Site



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existing building and an annex and an adjacent Gasification and Vitrification (GASVIT™) Building. The annex would be used for size reduction and screening systems, ventilation systems, and process chemical receipt and storage. The GASVIT™ Building would contain the gasification and vitrification operations (thermal treatment) and would not be used to treat the waste stream evaluated in this EA. The waste steam evaluated in this EA would be treated in the Stabilization Building.

The Stabilization Building would be used for receiving, shipping, and staging process chemicals, pre-treatment, non-thermal treatment, nonprocess support, and ancillary systems. The Waste Storage Building would be an 1,850 square meter (m^2) (19,900 square foot [ft^2]) building that would be used to store and stage waste prior to treatment and following treatment pending transport back to the Hanford Site. The storage building would have two sections, an enclosed area and an unenclosed storage pad, with storage cabinets and would be designed specifically for hazardous material storage. The Administrative Building would be approximately 350 m^2 (3,800 ft^2) and would be used for access control functions, administrative offices, and the on-site analytical laboratory.

Waste from commercial generators as well as from DOE potentially could be treated in the Stabilization Building. Waste streams that are required to be kept separate for regulatory, technical, or administrative reasons would be stored, handled, and treated separately. Commercial and DOE generated wastes would be treated in separate campaigns to maintain waste stream segregation.

The ATG MWF would be designed and constructed in accordance with the applicable requirements for RCRA permitted hazardous waste treatment and storage facilities.

Material Movement

The Stabilization Building would receive containerized waste in either boxes or barrels. The methodology used to off-load containerized waste depends on the container size. For example, boxes would typically be off-loaded using a forklift. Following unloading, containers of compatible waste types may be provided with additional secondary containment and would be placed on pallets for processing or storage. Containers of incompatible waste would be provided with additional secondary containment or appropriately segregated and managed in accordance with the MWF regulatory requirements.

Waste acceptance would include inspecting shipping and pre-acceptance documentation. Additional waste acceptance requirements could include waste examination, chemical analysis, and treatability tests. Following waste acceptance procedures, the containerized waste would be transferred to the waste storage facility or to the appropriate pre-treatment or treatment area.

Treatment Processes

Operations at the MWF would include receiving and treating off-site generated waste, treating secondary waste, and temporarily storing waste prior to treatment and following treatment prior to off-site disposal. The facility would use two principal treatment processes; stabilization and macro encapsulation (Figure 2.3). Other treatment processes would be employed as pre-treatments for stabilization. The facility would be designed to meet regulatory-based treatment standards for debris that include the following technology-based and alternative treatment standards; physical extraction, stabilization/micro-encapsulation, neutralization, chemical oxidation, chemical reduction, macro-encapsulation, and deactivation.

Secondary waste generated as a byproduct of the treatment processes would be recycled or treated on-site, as necessary, prior to shipment off-site for disposal with the primary waste stream. For example, wastewater generated from the treatment processes would be treated and recycled for subsequent use in waste treatment (water for the stabilization process).

The non-thermal stabilization would be organized into waste pre-treatment and treatment processes depending on waste designation with four principal treatment lines for stabilization. The four treatment process lines would include soils/inorganic debris stabilization, inorganic liquids/sludge stabilization, lead and other metals stabilization, and heterogeneous debris stabilization.

Solids Stabilization

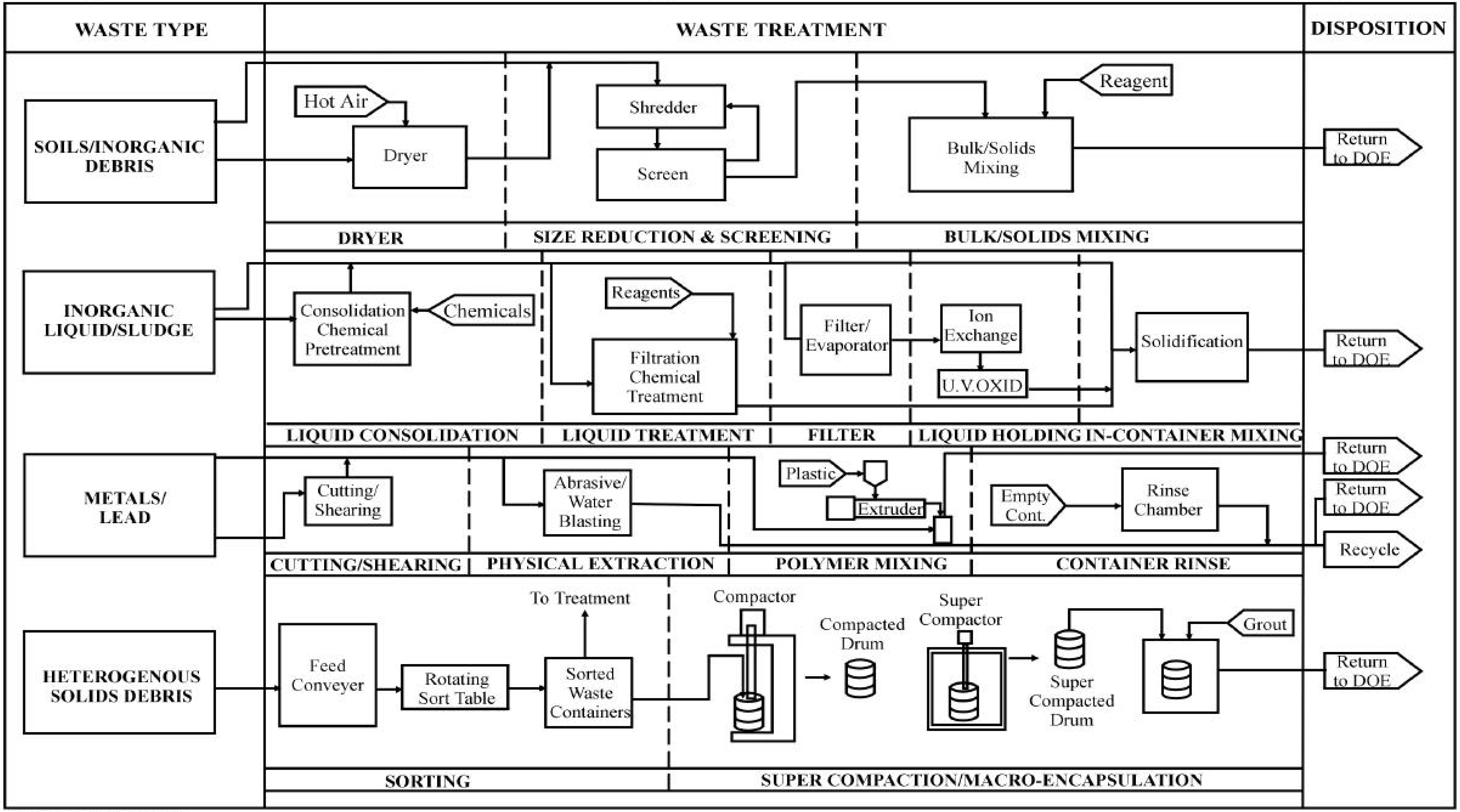
The solids stabilization process line would treat solids/inorganic debris waste and include pre-treatment and stabilization processes. The pre-treatment processes include drying, size reduction, and screening. The size reduction and screening pre-treatment would produce uniformly sized particles that meet the requirements of the stabilization process. The dryer would receive sludge, paste, and debris waste and would remove bound, absorbed, or free liquid.

Once the material was properly dried and sized, the material would be mixed with stabilization reagents (e.g., cement- or polymeric-like materials) in a bulk mixer and transferred to a disposal container to cure. Stabilization processes employ reagents to reduce the hazardous nature of a waste by converting the waste and its hazardous constituents into a form that minimizes the contaminant releases to the environment or reduces the degree of hazard. Typical stabilization reagents include cement-like materials, thermoplastic materials, and organic polymers. Typical disposal containers would include steel barrels or boxes suitable for waste handling, storage, and disposal.

Liquid Stabilization

The liquids stabilization line would treat inorganic liquids/sludges and include pre-treatment and in-container stabilization. The pre-treatment processes for liquids would include consolidation, treatment (e.g., neutralization), filtration, and holding.

Figure 2.3. ATG Richland Environmental Technology Center Non Thermal Treatment Process Flow Block Diagram



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Liquid waste would be transferred from small containers to larger containers in the liquid consolidation tank. Liquid pre-treatment would include neutralization, chemical oxidation, chemical reduction, and deactivation. Deactivation refers to treatments to remove the hazardous characteristics of a waste due to its ignitability, corrosivity, and or reactivity. After pre-treatment in a liquid treatment tank, liquids would be filtered, evaporated, or passed through an ion exchange column as necessary. Organics may also be destroyed by passing the liquids through an ultra-violet (UV) oxidation system. UV oxidation is a process where UV light is used to break down and detoxify organic materials. Empty containers would be decontaminated for reuse or sent to the appropriate waste treatment line for stabilization.

After pre-treatment, the liquid waste would be transferred to steel drums designed for waste storage and disposal. Reagents (e.g., grout) would then be mixed with the waste in the drums, and the drums would be sent to the staging area for inspection and shipping.

Metals/Lead Stabilization

The pre-treatment processes for the lead and other metals stabilization line would include cutting and shearing and physical extraction. In addition to metallic components; wood, plastic, and construction debris such as paneling also may be cut and sheared to the size required for further treatment.

The function of the physical extraction system would be to decontaminate and package the incoming surface contaminated bulk metals, bulk non-metals, loose metals, and empty metal containers by abrasive and non-abrasive blasting processes (e.g., dry ice grit blasting).
This system would be designed to decontaminate surfaces of mixed low-level debris waste by removing contaminants. Surface materials and contaminants would be removed by the extraction process and, together with spray water, collected and recycled through a filter to separate the liquids and solids. Debris that cannot be decontaminated would be macro-encapsulated by mixing the debris with a polymer and returned to DOE for eventual land disposal.

The reclaimed water would be returned to the spray system, and filtered solids would be sent to the solids stabilization line for treatment. Excess liquid produced by the decontamination unit operation would be transferred to the liquids stabilization line for treatment.

Heterogeneous Debris Stabilization

The pre-treatment processes in the heterogeneous solid debris stabilization line would include sorting and supercompaction. The sorting operation would include emptying the contents of the waste containers on a sorting table and segregating the waste according to the designated treatment groups (see waste types identified in Figure 2.3). The sorted waste would be placed in conveyor bins and sent to the appropriate treatment line (one of the four other treatment lines). After sorting, the heterogeneous debris would be supercompacted (compaction using specialized equipment producing higher than normal compaction) to reduce its volume.

Equipment in the compaction area would reduce the volume of debris waste by ratios in excess of 7 to 1, leaving a thin compacted puck. The compaction methods would include both in-barrel and super-compaction devices. After compaction, waste would be macro-encapsulated by placing the compacted pucks in a drum or container and filling the void space between the compacted waste and the container with grout to encapsulate the compacted waste. Macro-encapsulation also may be performed by packaging the compacted pucks into a package meeting the "jacket" requirements under the debris treatment rule (such as stainless-steel or high-density polyethylene containers with the void spaces filled).

Post-Treatment Waste Management and Transportation

Following waste treatment at the MWF, containers of treated waste would be certified prior to shipping, which would include reviewing the processing performed and treated sample test documentation to ensure that the treated waste would meet the Hanford Site acceptance requirements. Treated waste containers would be labeled for shipment, manifested, and either loaded onto trucks for shipment to the Hanford Site for eventual land disposal or transferred to the storage facility. No waste disposal would take place at the MWF.